Suggested Summer Reading Assignments

Suggested summer reading can be submitted as extra credit. Questions to guide your summary will be provided through Core LMS Classroom.

Due Dates for Suggested Summer Reading:
- 1st Nine Weeks: October 4, 2019
- 2nd Nine Weeks: December 13, 2019
- 3rd Nine Weeks: March 3, 2020
- 4th Nine Weeks: May 15, 2020


In a journey across the Arctic to find out why it is toxic, an environmental journalist reports on the dangers of pollution to fragile ecosystems, how Arctic cultures are adapting to pollution, and what solutions will prevent this crisis from getting worse.

Discussion Questions

1. Why does the author state that the Inuksuit are moral compasses?

2. What is the Arctic paradox? Describe it in detail.

3. Describe the path of PCBs from a fire in Chicago to the Arctic Ocean. Include the length of time the PCBs will need to reach the Arctic Ocean.

4. Complete the following chart.

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>Name/Example</th>
<th>Source</th>
<th>Water-Soluble or Fat-Soluble</th>
<th>Found in What Tissue/ Organism</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCBs</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DDT</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brominated flame retardants</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mercury</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PBDEs</td>
<td></td>
<td></td>
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<tr>
<td>PFOS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Methoxychlor</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Endosulfan</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

5. Describe how the Inuit’s traditional diet is a two-edged sword.

6. How has scientific communication been important in the identification of toxins in the Arctic Circle (in humans as well as other animals).

7. Why does the author call the Arctic’s indigenous people “lab rats?”

8. Why was or is the Inuit diet consider(ed) so healthy?
9. What is social injustice? How is the polluting of the Arctic an example of social injustice?

10. Why is the study of polar bears and their reaction to the pollutants in the Arctic so important?

11. What societal changes does the author think will occur if Arctic pollution continues to affect the indigenous humans and their food source(s)?

12. Select one group of Arctic indigenous people and describe how their way of life and how the pollution of the Arctic Circle has affected their way of life.

13. According to the author, is prevention of the pollution or a cure of the effects better? Why?

14. What are some problems with informing the Arctic indigenous people of the threat posed by the pollution?

15. What effects does the author propose global climate change will have on the pollution in the Arctic?

16. According to the author, what do scientists say about the diagnosis and remedy of Arctic pollution?
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Description: In *The Serengeti Rules*, award-winning biologist and author Sean Carroll tells the stories of the pioneering scientists who sought the answers to such simple yet profoundly important questions, and shows how their discoveries matter for our health and the health of the planet upon which we depend.

Rather than chapter-specific questions, your reading guides will ask you to summarize each chapter, explain its relevance to the rule mentioned in the book, and connect the experiment mentioned with the nature of science. The book contains 10 chapters so you should have 10 sets of answers for the questions. Please include the questions in the document you complete. See basic understandings about science below the questions to help you.

Chapter Number: __________ Chapter Title: ______________________________________________

1. Which rule or rules are described in the chapter?
2. Summarize the key finding or findings described in the chapter in 3-5 sentences.
3. Describe the scientist(s) mentioned in the chapter in terms of the following:
   a. Their personal and educational background.
   b. How did they collect evidence used in this chapter?
   c. What challenges or obstacles did they face in terms of collecting, analyzing, or publicizing data?
   d. How does their research support the rule or rules you identified in question 1?
4. Select at least two of the basic understandings from ‘Nature of Science’ and explain how this chapter fits those basic understandings.
5. Connect the example given in the chapter to another example given in a different chapter. How does this show a similar pattern of regulation across various scales (from molecular to cellular to organismal to ecological)?

The basic understandings about the nature of science are listed below (as numbered items) with explanations of each item.

1. Scientific Investigations Use a Variety of Methods
   - Science investigations use diverse methods and do not always use the same set of procedures to obtain data.
   - New technologies advance scientific knowledge.
   - Scientific inquiry is characterized by a common set of values that include: logical thinking, precision, open-mindedness, objectivity, skepticism, replicability of results, and honest and ethical reporting of findings.
   - The discourse practices of science are organized around disciplinary domains that share exemplars for making decisions regarding the values, instruments, methods, models, and evidence to adopt and use.
• Scientific investigations use a variety of methods, tools, and techniques to revise and produce new knowledge.

2. Scientific Knowledge is Based on Empirical Evidence

• Science disciplines share common rules of evidence used to evaluate explanations about natural systems.
• Science includes the process of coordinating patterns of evidence with current theory.
• Science arguments are strengthened by multiple lines of evidence supporting a single explanation.

3. Scientific Knowledge is Open to Revision in Light of New Evidence

• Scientific explanations can be probabilistic. Most scientific knowledge is quite durable but is, in principle, subject to change based on new evidence and/or reinterpretation of existing evidence.
• Scientific argumentation is a mode of logical discourse used to clarify the strength of relationships between ideas and evidence that may result in revision of an explanation.

4. Scientific Models, Laws, Mechanisms, and Theories Explain Natural Phenomena

• Theories and laws provide explanations in science, but theories do not with time become laws or facts.
• A scientific theory is a substantiated explanation of some aspect of the natural world, based on a body of facts that has been repeatedly confirmed through observation and experiment, and the science community validates each theory before it is accepted. If new evidence is discovered that the theory does not accommodate, the theory is generally modified in light of this new evidence.
• Models, mechanisms, and explanations collectively serve as tools in the development of a scientific theory.
• Laws are statements or descriptions of the relationships among observable phenomena.
• Scientists often use hypotheses to develop and test theories and explanations.

5. Science is a Way of Knowing

• Science is both a body of knowledge that represents a current understanding of natural systems and the processes used to refine, elaborate, revise, and extend this knowledge.
• Science is a unique way of knowing and there are other ways of knowing.
• Science distinguishes itself from other ways of knowing through use of empirical standards, logical arguments, and skeptical review.
• Science knowledge has a history that includes the refinement of, and changes to, theories, ideas, and beliefs over time.

6. Scientific Knowledge Assumes an Order and Consistency in Natural Systems

• Scientific knowledge is based on the assumption that natural laws operate today as they did in the past and they will continue to do so in the future.
• Science assumes the universe is a vast single system in which basic laws are consistent.

7. Science is a Human Endeavor

• Scientific knowledge is a result of human endeavor, imagination, and creativity.
• Individuals and teams from many nations and cultures have contributed to science and to advances in engineering.
• Scientists’ backgrounds, theoretical commitments, and fields of endeavor influence the nature of their findings.
• Technological advances have influenced the progress of science and science has influenced advances in technology.
• Science and engineering are influenced by society and society is influenced by science and engineering.
8. Science Addresses Questions About the Natural and Material World

- Not all questions can be answered by science.
- Science and technology may raise ethical issues for which science, by itself, does not provide answers and solutions.
- Science knowledge indicates what can happen in natural systems — not what should happen. The latter involves ethics, values, and human decisions about the use of knowledge.
- Many decisions are not made using science alone, but rely on social and cultural contexts to resolve issues.
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*The Ghost Map* is a riveting page-turner about a real-life historical hero, Dr. John Snow. It's the summer of 1854, and London is just emerging as one of the first modern cities in the world. But lacking the infrastructure -- garbage removal, clean water, sewers -- necessary to support its rapidly expanding population, the city has become the perfect breeding ground for a terrifying disease no one knows how to cure. As the cholera outbreak takes hold, a physician and a local curate are spurred to action--and ultimately solve the most pressing medical riddle of their time.

DISCUSSION QUESTIONS: Answer in a document. Include the questions in your document.

1. Johnson describes the book as having four protagonists: Doctor John Snow, Reverend Henry Whitehead, the *Vibrio cholerae* bacteria, and the city of London. What does he mean by including London as a “character” in the book? How does he achieve that? And is it effective?

2. During the outbreak, the London Times and Morning Chronicle were filled with a plethora of dubious remedies from a variety of unqualified sources. Compare the Internet of today with the London Times of 1854. Has information literacy improved such that the average citizen can distinguish trustworthy advice from chicanery on the Web?

3. The Ghost Map reads like a thriller at times. How does Johnson create suspense despite the known facts of cholera’s trigger and remedy?

4. The Ghost Map is filled with historical and scientific tangents—for instance, about the biological role of fermentation and alcohol in the development of Western Civilization. How do these enrich the storytelling and reading experience without being distracting? Or do they?

5. Whitehead was effective as an independent researcher in part because he had intimate knowledge of Soho and its residents and was not timid about asserting and building on his knowledge. He stood his ground on the issue of an “index case,” for example, which led to the reexamination of the Broad Street well. How did his neighborhood knowledge help solve the case? How might his social status have added weight to his influence over events? What if a similarly independent, civic-minded midwife or journalist had been in his role?

6. The profession of a physician was clearly a very different one in 1854 than it is now, particularly as John Snow practiced it. What do you see as the major differences? Given both Snow's practical and theoretical work, what professions and fields in today's world, if any, might be more similar to what John Snow did? The role of the church in people’s lives is also different. Do you think the role of the Reverend, as Henry Whitehead fulfilled it, has changed as much as the role of the doctor has changed since 1854?
7. We are used to seeing the medical community clash with religious leaders on issues from genetic research to euthanasia. Is partnership on some level between the medical and religious communities sometimes necessary for progress today, as it was in Snow’s and Whitehead’s time?

8. Johnson writes about the pervasiveness of the miasma theory, emphasizing that even some of the most brilliant medical minds rejected the notion of waterborne contagions despite evidence to the contrary. What were some of the factors that contributed to this massive mental block?

9. Johnson draws our attention to the fact that Whitehead was relegated to the role of Snow’s apprentice by popular Victorian literature. Johnson’s own opinion is that Whitehead’s “engaged amateurism” was so important as to make his role virtually equal to that of Snow’s in solving the mystery of cholera. What is your assessment?

10. How was the Board of Health both a positive and negative force as London evolved into a modern city?

11. Johnson debunks several popular misconceptions about Snow’s actual map, principally that the map itself led to the end of the outbreak. Yet he still names his book after the map. Why? Given Johnson’s take on the map’s limited practical role vis-à-vis this particular cholera outbreak, do you accept his contention for its continued significance?

12. Snow had to work harder to disprove the miasmatists with his analysis of the Lambeth and S&V water supply case because the data showed that the subdistricts that relied on the polluted water source also happened to be in less desirable industrial zones. Discuss modern examples of how socio-geo-economic issues can influence scientific and medical assessments.

13. Given the relative living conditions, the cultural life, the economic opportunities, and any other costs and benefits, would you have chosen to live in London during the Victorian Era? Why do you think John Snow and others who could presumably afford to live elsewhere chose to live in a city that apparently seemed to always be on the brink of collapse into pure squalor?

14. In the latter part of the book, Johnson makes a case for urbanization as the most significant trend of the modern era—highlighting the fact that as of 2007, over 50% of the world’s population lives in cities. Johnson views this as a positive trend, an irreversible trend, and ultimately a necessary trend for the future of the planet because of the ecological implications of urban living. Do you agree with his positive assessment? Does reading a story like that of The Ghost Map make you feel more or less positive about cities and urbanization?

15. In his epilogue, Johnson posits that our survival as a “city-planet” relies on our willingness to embrace science and improve public health systems in the developing world. What do you see as the role of developed societies in this scenario? How do high profile philanthropists such as Bill and Melinda Gates fit into the picture?

16. Johnson cites the continued unavailability of clean water in many parts of the world as the single-most serious—and perhaps the most reprehensible—issue facing the world today. Do you share that assessment? Do you think the world will need to relive crises equivalent to the cholera outbreak of 1854 to achieve solutions that are equivalent to the construction of London’s modern sewer system? Or will technology and the highly-connected state of the world accelerate solutions?
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Her name was Henrietta Lacks, but scientists know her as HeLa. She was a poor black tobacco farmer whose cells—taken without her knowledge in 1951—became one of the most important tools in medicine, vital for developing the polio vaccine, cloning, gene mapping, in vitro fertilization, and more. Henrietta’s cells have been bought and sold by the billions, yet she remains virtually unknown, and her family can’t afford health insurance.

Discussion Questions

1. On page xiii, Rebecca Skloot states, “This is a work of nonfiction. No names have been changed, no characters invented, no events fabricated.” Consider the process Skloot went through to verify dialogue, re-create scenes, and establish facts. Imagine trying to re-create scenes such as when Henrietta discovered her tumor (page 15). What does Skloot say on pages xiii–xiv and in the notes section (page 346) about how she re-created such scenes?

2. One of Henrietta’s relatives said to Skloot, “If you pretty up how people spoke and change the things they said, that’s dishonest (page xiii).” Throughout the book, Skloot is true to the dialect in which people spoke to her: The Lackses speak in a heavy Southern accent and Lengauer and Hsu speak as non-native English speakers. What impact did the decision to maintain speech authenticity have on the story?

3. As much as this book is about Henrietta Lacks, the book is also about Deborah learning of the mother she barely knew, while also finding out the truth about her sister, Elsie. Imagine discovering similar information about one of your family members. How would you react? What questions would you ask?

4. In a review for the New York Times, Dwight Garner writes, “Ms. Skloot is a memorable character herself. She never intrudes on the narrative, but she takes us along with her on her reporting.” How would the story have been different if she had not been a part? What do you think would have happened to scenes like the faith healing on page 289? Are other scenes where her presence made a difference? Why do you think she decided to include herself in the story?
5. Deborah shares her mother’s medical records with Skloot but is adamant that she not copy everything. On page 284 Deborah says, “Everybody in the world got her cells, only thing we got of our mother is just them records and her Bible.” Discuss the deeper meaning behind this statement. Think not only of her words, but also of the physical reaction she was having to delving into her mother’s and sister’s medical histories. If you were in Deborah’s situation, how would you react to someone wanting to look into your mother’s medical records?

6. This story has many layers. Though the story is not told chronologically, the tale is divided into three sections. Discuss the significance of the titles given to each part: Life, Death, and Immortality. How would the story have been different if told chronologically?

7. As a journalist, Skloot is careful to present the encounter between the Lacks family and the world of medicine without taking sides. Since readers bring their own experiences and opinions to the text, some may feel she took the scientists’ side, while others may feel she took the family’s side. What are your feelings about this possible bias? Does your opinion fall on one side or the other, or somewhere in the middle? Why?

8. Henrietta signed a consent form that said, “I hereby give consent to the staff of The Johns Hopkins Hospital to perform any operative procedures and under any anaesthetic either local or general that they may deem necessary in the proper surgical care and treatment of: _______” (page 31). Based on this statement, do you believe TeLinde and Gey had the right to obtain a sample from her cervix to use in their research? What information would they have had to give her for Henrietta to have given informed consent? Do you think Henrietta would have given explicit consent to have a tissue sample used in medical research if she had been given all the information? Do you always thoroughly read consent forms before signing them?

9. In 1976, when Mike Rogers’s Rolling Stone article was printed, many viewed it as a story about race (see page 197 for reference). How do you think public interpretation might have been different if the piece had been published at the time of Henrietta’s death in 1951? How is this different from the way her story is being interpreted today? How do you think Henrietta’s experiences with the medical system would have been different had she been a white woman? What about Elsie’s fate?

10. Consider Deborah’s comment on page 276: “Like I’m always telling my brothers, if you gonna go into history, you can’t do it with a hate attitude. You got to remember, times was different.” Is it possible to approach history from an objective point of view? If so, how and why is this important, especially in the context of Henrietta’s story?

11. Deborah says, “But I always have thought it was strange, if our mother cells done so much for medicine, how come her family can’t afford to see no doctors? Don’t make no sense” (page 9). Should the family be financially compensated for the HeLa cells? If so, who do you believe that money should come from? Do you feel the Lackses deserve health insurance even though they can’t afford it? How would you respond if you were in their situation?

12. Dr. McKusick directed Susan Hsu to contact Henrietta’s children for blood samples to further HeLa research; neither McKusick nor Hsu tried to get informed consent for this research. Discuss whether or not you feel this request was ethical. Further, think about John Moore and the patent that had been filed without his consent on his cells called “Mo” (page 201). How do you feel about the Supreme Court of California ruling that states when tissues are removed from your body, with or without your consent, any claim you might have had to owning them vanishes?

13. Religious faith and scientific understanding, while often at odds with each other, play important roles in the lives of the Lacks family. How does religious faith help frame the Lackses’ response to and interpretation of the scientific information they receive about HeLa? How does Skloot’s attitude toward religious faith and science evolve as a result of her relationship with the Lackses?
14. On page 261, Deborah and Zakariyya visit Lengauer’s lab and see the cells for the first time. How is their interaction with Lengauer different from the previous interactions the family had with representatives of Johns Hopkins? Why do you think it is so different? What does the way Deborah and Zakariyya interact with their mother’s cells tell you about their feelings for her?

15. Reflect upon Henrietta’s life: What challenges did she and her family face? What do you think their greatest strengths were? Consider the progression of Henrietta’s cancer in the last eight months between her diagnosis and death. How did she face death? What do you think that says about the type of person she was?